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CLAIMS

1. Gene expression system,
characterized in that it comprises a gene/genes of interest that by genetic
engineering have been operably linked to a strongly regulated promoter
whose activity can be induced by an unmodified peptide, wherein said
promoter and peptide are functional equivalent to promoters and peptides
involved in the production of bacteriocins, except nisin, in lactic acid
bacteria, and in that the products of two regulatory genes encoding a so
called two-component regulatory system are essential for transducing the
signal provided by said peptide into a change in activity of said strongly
regulated promoter, and in that in naturally occurring lactic acid bacteria said
regulatory genes are co-transcribed or closely associated with genes encoding
said peptide, wherein the said peptide is a functional analogue of the peptide
having the sequences shown in Seq. id. No. 1 and Seq. id. No. 2, and in that
said gene/genes of interest are not identical to the genes that are operably
linked to said promoter elements in the lactic acid bacterium from which said
promoter elements are derived.
2. Gene expression system according to claim 1,
characterized in that said peptide is capable of inducing its own production
and/or the production of one or more bacteriocins in lactic acid bacteria.
3. Gene expression system according to claims 1-2,
characterized in that said peptide is identical to the peptide having the
sequences of Seq. id. No. 1 and Seq. id. No. 2.
4. Gene expression system according to claims 1-3,
characterized in that said promoter is identical or functionally analogous to
the promoter elements shown in Fig. 4.
5. A recombinant vector,
characterized in that it comprises the gene/genes operably linked to the
promoter elements according to claim 1-4, wherein this gene/these genes are
not identical to the genes that are operably linked to said promoter elements
in the lactic acid bacterium from which said promoter elements are derived.

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6. A host cell,
characterized in that it contains the gene/genes of claim 5 operably linked to
the promoter, and in that the expression of the said gene/genes can be
regulated by adding a peptide according to ^{Claim 1} ~~claims 1-4~~.

5 7. The host cells of claim 6,
characterized in that some of the said genes and promoter elements are
present in plasmids and some are present in the chromosome.

8. The host cells of ^{Claim 2} ~~claims 6-7~~,
characterized in that the host is a Gram-positive bacterium, preferably a
10 lactic acid bacterium.

9. The host cell of ^{Claim 3} ~~claims 6-8~~,
characterized in that said host possesses the food consumption classification
of GRAS (Generally Regarded As Safe).

10. The host cells of ^{Claim 4} ~~claims 6-9~~,
characterized in that it is selected from the group consisting of members of
15 the genera *Lactobacillus*, *Lactococcus*, *Pediococcus*, preferably members of
the genus *Lactobacillus*, more preferably of *Lactobacillus sake* and
Lactobacillus plantarum, most preferably of *Lactobacillus sake* LTH673 and
Lactobacillus plantarum C11.

20 11. Peptide,
characterized in that it has the amino acid sequence of Met-Ala-Gly-Asn-
Ser-Ser-Asn-Phe-Ile-His-Lys-Ile-Lys-Gln-Ile-Phe-Thr-His-Arg (seq. id. no. 1).

25 12. Use the gene expression system according to claim 1 ^{Claim 5} ~~1-4~~, in any of the
host cells described in ~~claims 6-10~~ to induce gene expression by adding any
of the peptides described in claim 3.

13. Use of any of the host cells of ^{Claim 6} ~~claims 6-10~~ in fermentations.

14. Use of any of the host cells of ^{Claim 6} ~~claims 6-10~~ to produce a desired protein
of interest.

AMENDED SHEET

15. A kit for using the expression system according to claim 1, in lactic acid bacteria, characterized in consisting of:

5 1) One or more recombinant vectors each vector containing a promoter element identical or similar to one of the promoter elements depicted in Fig. 4, directly followed by a multiple cloning site; these vectors may also contain one or more genes selected from the group K, R, IF, T, A (Fig. 1) or functional analogues of these genes,

10 2) Lactic acid bacteria that can function as host strain for these recombinant vectors, and that, depending on the recombinant vector used, may contain one or more genes selected from the group K, R, IF, T, A (Fig. 1) (or functional analogues of these genes) integrated in the chromosome, such that at least the genes K and R or functional analogues thereof are present in said lactic acid bacteria containing said recombinant vector.

15 3) A peptide that is capable of inducing the expression of genes under control of promoter elements similar or identical to the promoter elements depicted in Fig. 4 and that needs a two component system similar or identical to that encoded by genes K and R (Fig. 1) to exert its inducing action.



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